Paper ID: 73667
oral

IAF SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations - IAF SPACE PROPULSION SYMPOSIUM (IPB)

Author: Mr. Sasi Kiran Palateerdham
University of Rome "La Sapienza", Italy

Mr. Kathiravan Thangavel
Royal Melbourne Institute of Technology (RMIT), Australia
Dr. Antonella Ingenito
Sapienza University of Rome, Italy

NOVEL ELECTRO-CHEMICAL MINIATURIZED THRUSTERS FOR DISTRIBUTED SATELLITE SPACE MISSIONS

Abstract

The Distributed Satellite System (DSS) philosophy is that several satellites can work together to accomplish the same purpose as a single large, i.e., Monolithic Satellite, which is usually more expensive. DSS provides several advantages over larger satellites, including simpler design, faster production time, lower replacement costs, higher redundancy, and unparalleled high resolution. Due to uncertainty in the status of the formation and/or the risk of one of the spacecrafts failing, the key challenge is maintaining the formation geometry and avoiding unintended collisions between spacecraft. Small satellite capabilities and uses are quickly developing in the New Space business, because of advancements in electronics and shrinking. Small satellites have several advantages, including a shorter development time, lower costs, simple maintenance, and mass production. As a result, tiny satellites are currently being investigated for nearly all space applications. Because of the ability to adapt and reconfigure the formation, incrementally add new or update older pieces of the structure, which provides inherent versatility, multi-mission capabilities and design flexibility, mission enhancement, and so on, advancements in the Distributed Satellite System (DSS) have undoubtedly increased the mission value in recent years. The Earth Observation (EO) mission and other satellite missions employ DSS explicitly. The satellite is subjected to a number of perturbations once it is launched into orbit around the Earth, and the satellites must function in the formation and coordinate with one another in order to meet the mission's objectives. Miniaturized propulsion technologies including a hybrid electro-chemical propulsion system has been investigated as feasible solution in achieving mission designs and maintaining satellite formation flying in this environment. Microsatellites form factor has been accounted for the design and integration of the propulsion system within the mass, volume, and power constraints.